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Abstract

Field Observations of Environmental Exposure dose from Radio-Argon Clouds

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^{41}Ar produced in the air found in irradiating pockets of beam tubes is the only gaseous radioactive material produced during normal operation of certain types of reactors that can cause external exposure hazards to neighboring population. At the same time, this provides a good and effective tracer to determine experimentally diffusion patterns of gaseous waste into atmosphere.

In the Health Physics Division of the Japan Atomic Energy Research Institute field observations were undertaken to measure ^{41}Ar for the dual purpose of determining the environmental exposure dose by ^{41}Ar from several reactors, and for checking experimentally the dose estimation by Pasquill-Meade's method, which has been adopted by the Atomic Energy Commission of the Japanese Government as standard method of analysis for diffusion problems.

The observations were carried out 4 times altogether in the period from 1961 to 1962, using JRR-2 which is an enriched uranium fueled heavy water reactor of 10 MW.

The results of observation showed that the estimation of external dose by Pasquill-Meade's method agreed with measured data in first approximation, and it was concluded that it is satisfactory to use the

method to solve problems in practice. The last run of observations was carried out in so called "calm condition". In this case, the dose distribution curves were found to be quite complex and it was difficult to analyse the results completely; but the obtained values give an indication of the correction factor to be applied to calculated values for a safe-side estimation of the dose.

In the paper, a description is given of the field observations undertaken, including the instruments used, together with meteorological data and isodose patterns in each run of observation, as well as some analysis on population dose based thereon.